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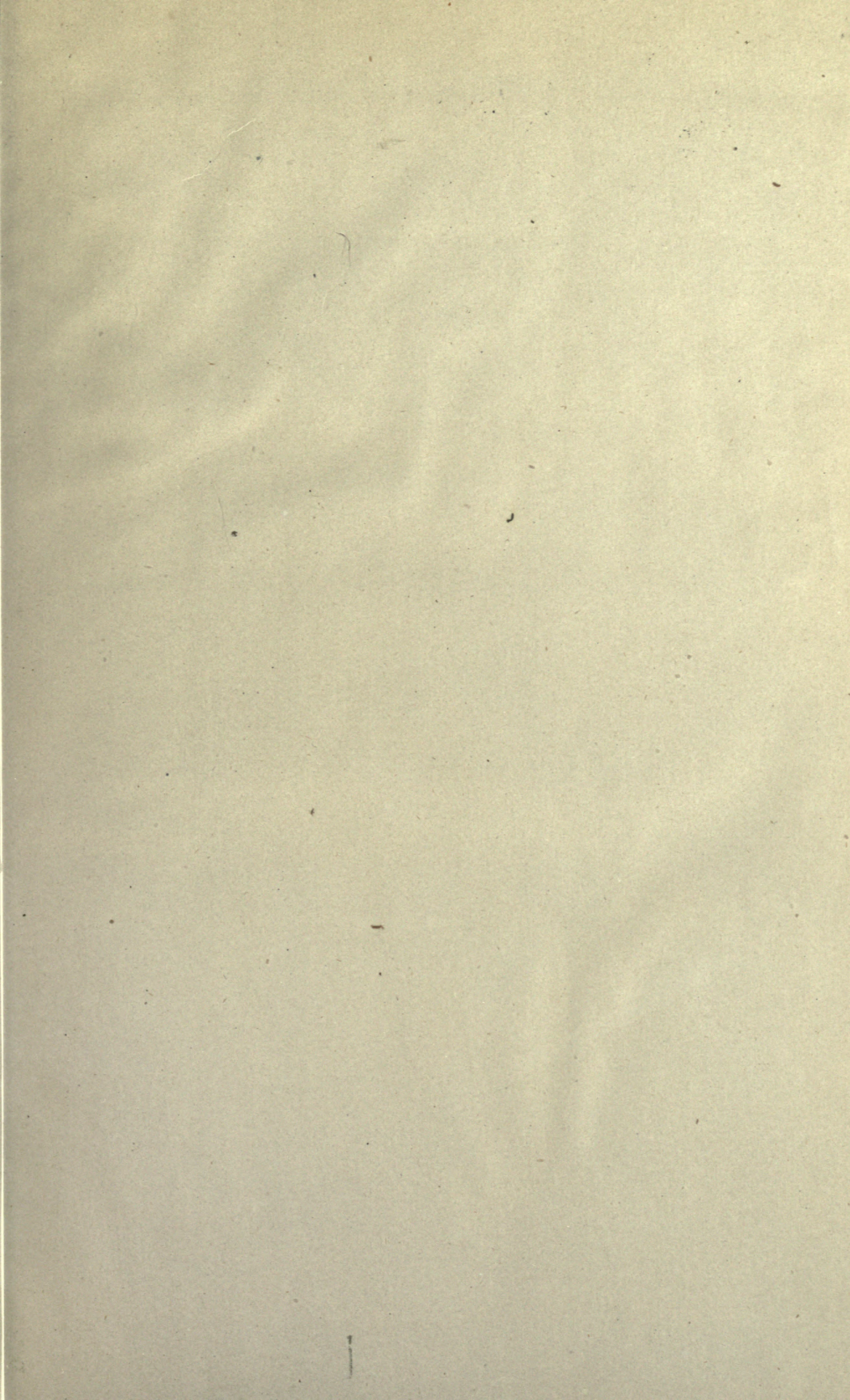
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GEOLOGICAL SURVEY OF OHIO

EDWARD ORTON, JR., State Geologist.

A BIBLIOGRAPHY OF OHIO GEOLOGY

PART ONE.

A Subject Index of the Publications of the Geological Survey
of Ohio, from its Inception to and including Bulletin
Eight of the Fourth Series

BY

ALICE GREENWOOD DERBY, B. PH., B. A.



PART TWO.

A Bibliography of the publications relating to the Geology of
Ohio, other than those of the State
Geological Survey.

BY

MARY WILSON PROSSER.

Published by authority of the Legislature of Ohio, under the supervision
of the State Geologist.

COLUMBUS, OHIO, AUGUST, 1906.

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Springfield, Ohio.



LETTER OF TRANSMITTAL.

To His Excellency ANDREW L. HARRIS, *Governor of Ohio.*

SIR:—I have the honor to present to you, herewith, the Sixth Bulletin of the fourth series of the publications of the Geological Survey of Ohio. The subject is A Bibliography of Ohio Geology. It is in two parts, the first of which gives an exhaustive analysis of the publications of the Geological Survey of Ohio, from its earliest organization down to the eighth Bulletin of the Fourth Series, published in August, 1906, and which has been prepared by Miss Alice Greenwood Derby, B.Ph., B.A. The second part is an equally painstaking list of all references to Ohio Geology appearing in other publications than the official publications of the Geological Survey of Ohio, and has been prepared by Mary Wilson Prosser (Mrs. C. S. Prosser). The two lists are mutually complementary. I submit this work to you with confidence that it will greatly improve the accessibility, and hence the value, of the studies thus far made in the field of Ohio geology.

I have the honor to be,

Yours very respectfully,

EDWARD ORTON, Jr., E. M.

State Geologist.

OFFICERS OF THE SURVEY.

EDWARD ORTON, JR., E. M. State Geologist

CHARLES SMITH PROSSER, M. Sc. Assistant Geologist
Areal and Stratigraphical Geology.

JOHN ADAMS BOWNOCKER, D. Sc. Assistant Geologist
Economic Geology.

NATHANIEL WRIGHT LORD, E. M. Consulting Chemist
Constitution and Utilization of Coals.

MRS. M. R. McCLELLAND Stenographer and Clerk

ANNOUNCEMENTS BY THE STATE GEOLOGIST.

BULLETIN SIX.

This Bulletin aims to present to the public a thorough analytical statement of what has been done by the various individuals and organizations which have represented the Geological Survey of Ohio since the State first took up this branch of its duties, or who have written on the subject of the Geology of Ohio in any of its numerous phases. It is, of course, realized that no such work is ever entirely complete, and in the nature of the case cannot be made so, but it is believed that the present work covers in its two branches all of the most important contributions in this field.

The purposes served by a bibliography are in general well known, but it is probably not realized by the average reader how exceedingly important this branch has become in all lines of scientific, historical or literary research. The constant and increasing subdivision of knowledge, the enormous increases in book-making and book circulation and the unparalleled number of persons entering into research, make improvement in our systems of classification and storing knowledge one of the vital necessities of our day. While a library is of the greatest value as a storehouse or receptacle of knowledge, yet it is well nigh valueless unless it is well indexed. Further, the indices must be several, from different systems of classifications—subjects, titles, authors, etc. Indices are to a library what the ledger is to a commercial company. Without their assistance, the investment would be well nigh worthless and certainly unprofitable.

Besides the general reasons in favor of the making of bibliographies, as a means of extending knowledge, there are special reasons why this work should be done in Ohio by the Geological Survey. As is well known, the early volumes of the Survey were published in large numbers, and distributed through the General Assembly. But, in all this lavish expenditure of expensive printing, there was no systematic effort made to see that copies of the reports were placed in the libraries of the cities and towns of Ohio, or in the libraries of Ohio schools and colleges; still less was done in the way of securing systematic exchange with the Surveys of other states and foreign countries. As a result, some large and well endowed libraries have complete sets of our publications, which they have secured chiefly by purchase from private owners; smaller and unendowed libraries more often have broken sets, secured by donation, but which they have not been able to complete; while

the vast majority of small libraries, both in Ohio and over the country generally, especially those of recent establishment, have only odd volumes of our publications or none at all.

It is now too late to remedy the damage done by the wasteful system of free distribution of these reports; the total known supply now held for sale among second-hand book-dealers and collectors is very small; reprinting would be too costly to be seriously considered.

But one thing remains to be done—if the old reports cannot be furnished to the libraries, we can at least furnish a complete statement of what they contained, so that scholars who desire to search the literature of our Survey can at least find in advance whether it contains any articles or references to the points they are looking up. The modern system of library exchanges, by which one library can borrow from another a volume for temporary use, thus enables a scholar to obtain a copy of whichever one of our publications he may need, and to refer to it with precision and certainty, while without this bibliography he could only become aware of this fact by obtaining access to a set of our publications and himself studying out their contents.

The bibliography may then be regarded as an up-to-date feature of Geological Survey literature, which is well worth having on its own account, but which owing to the peculiar situation of the Geological Survey of Ohio in regard to its literature is for us doubly necessary and important. In fact, it is the one and indispensable thing which can be done to remedy a bad situation so far as it may be remedied.

This Bulletin has been prepared in view of these considerations, and with a view to making it an aid to the geologist, the student, the practical man who may need to consult the work of this Survey. It is a source of regret, that there cannot be published at the same time and place a list of the places in Ohio where access to full sets of the reports may be had, but this information is not at hand and would be difficult to obtain.

PUBLICATIONS OF THE SURVEY.

Since this volume is itself the most careful list ever prepared on this subject, the usual abbreviated notice published in the other volumes of this series is omitted.

DISTRIBUTION OF REPORTS.

First Geological Survey.—These volumes are out of print and rare. They can only be procured from dealers in second-hand libraries and are difficult to obtain even there.

Second Geological Survey.—These volumes were all distributed at the time of their issue. The State retained no stock for meeting future demands, so that no copies of any of these volumes can be obtained from the office of the State Geologist. They can be bought in many second-hand book stores, and from dealers in old libraries, at prices ranging from a few cents to two or three dollars per volume, according to rarity and demand. Volumes V and VI are the rarest and most sought for.

Third Geological Survey.—These volumes were all distributed at the time of issue, except volume VII, of which 1,500 were put in the hands of the Secretary of State, for sale at the cost of publication. Of these, a few remain at the date of the publication of this volume. The price is \$1.50. To obtain copies, send postal or money order to the Secretary of State, State House, Columbus, Ohio. No other volumes can be obtained from this source.

The other volumes of this series can be procured only from second-hand book and library dealers.

Fourth Geological Survey.—Under the law, copies of these Bulletins can be bought at the office of the State Geologist at the cost of publication. Postal orders, money orders, checks, drafts, or currency must accompany orders. Stamps will not be received.

Bulletin 1—Oil and Gas	\$ 0.65
Bulletin 2—Uses of Hydraulic Cements.....	0.30
Bulletin 3—Manufacture of Hydraulic Cements— Issue exhausted.	
Bulletin 4—Lime Resources and Lime Industries— In press.	
Bulletin 5—Sand-Lime Brick Industry—In press.	
Bulletin 6—Bibliography of Ohio Geology.....	
Bulletin 7—Revised Nomenclature of the Ohio Geo- logical Formations.....	0.06
Bulletin 8—Salt Deposits and the Salt Industry in Ohio	0.06

LAWS UNDER WHICH THE SURVEY OPERATES.

For the information of the public, the law under which the work of the Survey is prosecuted is herewith published:

Laws of Ohio, 1889, Vol. 86, p. 262.

(Senate Bill 409.)

AN ACT

To Provide for the Extension of the Geological Survey of the State.

Section 1. Be it enacted by the General Assembly of the State of Ohio, That the governor is hereby authorized to appoint a state geologist, whose duty it shall be to continue and extend the investigations already made into the geological structure and resources of the state. Said state geologist shall be appointed for a term of two years, but he may be removed for cause at any time, and a successor appointed in his stead; and the governor is authorized to fill any vacancy which may occur from any cause, at any time. The compensation of said state geologist shall be at the rate of three hundred dollars per month, for the time actually employed; and said geologist shall have power to employ such assistants as he may need; but in no event shall the salary of the geologist, pay of assistants, and expense of the department, exceed the amount of the expenditure authorized by the general assembly.

Section 2. It shall be the duty of said geologist to study, and determine as nearly as possible, the number and extent of the various formations of the state; to represent the same, from time to time, upon properly constructed maps and diagrams; to study the modes of occurrence and the distribution of the useful minerals and products of these formations; to determine the chemical composition and structure of the same; to investigate the soils and water supply of the state; and to give attention to the discoveries of coal, building stone, natural cement, petroleum, gas and other natural substances of use and value to the state. He may also collect and describe the fossils of the various geological formations of the state; but no expenditure shall be incurred under this head that is not expressly ordered and provided for by the general assembly.

Section 3. The said geologist shall make, on or before the first day in February of each year, a report to the governor, covering the work of the preceding year, and the report shall be transmitted to the general assembly, to be printed in the same manner as other public documents, or as shall be otherwise ordered.

Section 4. The salaries of the state geologist, and the assistants employed by him, together with the traveling and incidental expenses, shall be paid monthly, on presentation of properly itemized vouchers, signed by the governor, out of the state treasury, from the appropriation made for such purpose.

Section 5. There is hereby appropriated from the general revenue fund the sum of one thousand dollars annually, for the purpose above named.

Section 6. This act shall take effect and be in force from and after its passage.

NOAH H. ALBAUGH.

Speaker pro tem. of the House of Representatives.

THEODORE F. DAVIS,

President pro tem. of the Senate.

Passed April 12, 1889.

From the terms of the law, it was evidently intended to provide for the creation of a bureau of geology to which only a portion of the time of the State Geologist should be applied, as the annual appropriation made was much too small to provide the salary of a State Geologist contin-

uously, without making any provisions for office expenses, assistance, etc. It was thought at that time that a few months' work per year would be sufficient to maintain the Survey abreast of geological developments.

The powers and duties of the State Geologist under this act were made so broad and general as to permit carrying on almost any work, so that no new legal provision was thought necessary in connection with reopening the work of the Survey under the Fourth organization. The sum designated in Section 5 is not made a limiting condition of the law so that the Legislature may appropriate any other amount, at its discretion, for carrying on the work.

Acting under this law, the Legislature has made the following appropriations for geological work:

Designation of Legeslature.	Year.	Amount Appropriated.
Seventy-Fourth	1900	\$2,500 .00
Seventy-Fourth	1901	\$3,500 00
Seventy-Fifth.....	1902	\$5,000 00
Seventy-Fifth.....	1903	\$3,000 00
Seventy-Sixth.....	1904	\$2,800 00
Seventy-Sixth.....	1905	\$2,900 00
Seventy-Seventh.....	1906	\$3,850 00*
Seventy-Seventh.....	1907	\$5,100 00

*And balance and receipts.

The law providing for the publication and distribution of reports is as follows:

Laws of Ohio, 1902, Vol. 95, p. 593.

(House Bill 800.)

AN ACT

To Provide for the Publication and Distribution of the Reports of the State Geologist.

Section 1. Be it enacted by the General Assembly of the State of Ohio, That whenever the state geologist shall have completed a bulletin upon any of the subjects upon which he is authorized to conduct investigation, he shall notify the state printing

commission of this fact, and it shall be the duty of this commission to determine the number of copies which shall be printed, and the grade of paper, the kind of binding, and any other details incident to its proper publication.

Section 2. It shall be the duty of said commission to provide for the publication of said bulletin as soon as possible after the completion of the same. The issue shall consist of a minimum number of three thousand copies.

Of these, one thousand copies, after deducting 200 for the State Library, shall be distributed pro rata among the general assembly.

One thousand shall be distributed free by the state geologist in exchange with other surveys, and with individuals whose services have been used in the collection or preparation of the matter for the bulletins. Of this number not more than four hundred may be distributed during the first year after publication, and not more than fifty in any subsequent year.

One thousand copies shall be set aside for binding along with other bulletins from time to time. When a sufficient number of such bulletins have accumulated to make collectively a volume of from 800 to 1,000 pages, they shall be bound, lettered and numbered, to take their place in the series of volumes already published by the survey.

The distribution of the bound volume of the survey shall be in the hands of the state geologist; but the state library shall receive ten copies, each member of the general assembly one copy, with privilege to draw not to exceed two other copies on application, and public libraries in the state shall be supplied with one copy each. The volumes remaining after these demands have been met, may be distributed among the geological surveys and geological societies of the United States and of foreign countries in exchange for their publications.

Section 3. The board may, at its discretion, order the publication of extra copies in addition to the three thousand already provided for. These extra copies shall be placed in the hands of the state geologist. From these members of the general assembly may, on application, draw up to fifty (50) copies each. Those remaining shall be placed on sale at a price equal to the net cost of printing and binding, which price is to be established by the state supervisor of public printing. The proceeds of such sales shall be accounted for and paid into the state treasury, and the state geologist shall be required by the commission to give suitable bond for the security of the funds thus passing through his hands. The proceeds of such sales shall be credited to the account of the geological survey, and shall be used for the prosecution of the further work of the survey without distinction from other funds which the general assembly from time to time appropriates for the survey.

Section 4. The cost of printing, illustrating, electrotyping, binding, et cetera, of said bulletins and said volumes, shall be paid from the general appropriation for state printing.

Section 5. This act shall take effect from and after its passage.

W. S. McKINNON,
Speaker of the House of Representatives.

F. B. ARCHER,
President of the Senate.

Passed May 12, 1902.

THE SURVEY IN ITS RELATIONS TO THE PUBLIC.

The usefulness of the Survey is not limited to the preparation of formal reports on important topics. There is a constant and insistent desire on the part of the people to use it as a technical bureau for free advice in all matters affecting the geology or mineral industries of the

State. A very considerable correspondence comes in, increasing rather than decreasing in amount, and asking specific and particular questions on points in local geology.

The volume of this correspondence has made it necessary to adopt a uniform method of dealing with these requests. Not all of them can be granted, but some can and should be answered. There is a certain element of justice in the people demanding such information, from the fact that the geological reports issued in former years were not so distributed as to make them accessible to the average man or community today. The cases commonly covered by correspondence may be classified as follows:

1st. Requests for information covered by previous publications.—This is furnished where the time required for copying the answer is not too large. Where the portion desired cannot be copied, the enquirer is told in what volume and page it occurs and advised how to proceed to get access to a copy of the report.

2d. Requests for identification of minerals and fossils.—This is done, where possible. As a rule, the minerals and fossils are simple and familiar forms, which can be answered at once. In occasional cases, a critical knowledge is required and time for investigation is necessary. Each assistant is expected to co-operate with the State Geologist in answering inquiries concerning his field.

3d. Requests from private individuals for analyses of minerals and ores, and tests to establish their commercial value.—Such requests are frequent. They cannot be granted, however, except in rare instances. Such work should be sent to a commercial chemical laboratory. The position has been taken that the Geological Survey is in no sense a chemical laboratory and testing station, to which the people may turn for free analytical work. Whatever work of this sort is done, is done on the initiative of the Survey and not at the solicitation of an interested party.

The greatest misapprehension in the public mind regarding the Survey is on this point. Requests for State aid in determining the value of private mineral resources, ranging from an assay worth a dollar, up to drilling a test well costing several thousand dollars, represent extreme cases. At present there is no warrant for the Survey making private tests, even where the applicant is entirely willing to pay for the service. In many cases individuals would prefer the report of a State chemist or State geologist to that of any private expert, at equal cost, because of the prestige which such a report would carry. But it is a matter of doubt whether it will ever be the function of the Survey to enter into commercial work of this character; it certainly will not be unless explicit legal provisions for it are made.

4th. *Requests from a number of persons representing a diversity of interests, who jointly ask the Survey to examine into and publicly report upon some matter of local public concern.*—Such cases are not common. It is not always easy to determine whether such propositions are really actuated by public interest or not. Each case must be judged on its merits. The Survey will often be prevented from taking up such investigations by the lack of available funds, while otherwise the work would be attempted.

The reputed discovery of gold is one of the most prolific sources of such calls for State examination. It usually seems wise and proper to spend a small sum in preventing an unfounded rumor from gaining acceptance in the public mind, before it leads to large losses, and unnecessary excitement. The duty of dispelling illusions of this sort cannot be considered an agreeable part of the work of the Survey, but it is nevertheless of very direct benefit to the people of the State.

BULLETIN NUMBER SIX.

PART ONE.

A SUBJECT INDEX OF THE PUBLICATIONS OF THE GEOLOGICAL
SURVEY OF OHIO, FROM ITS INCEPTION TO AND
INCLUDING BULLETIN NUMBER EIGHT,
SERIES FOUR.

BY

ALICE GREENWOOD DERBY, B. PH., B. A.

LETTER OF TRANSMITTAL.

Professor Edward Orton, Jr., State Geologist.

DEAR SIR:—I take pleasure in submitting to you the results of my study of the publications of the Geological Survey. I have gone outside of the actual publications of the Survey itself in a few cases, to include State documents obviously bearing on this work but not published under its auspices. I only did so from the feeling that the work would be incomplete without it.

Regarding the general scheme of classification used, I would say that while it would be possible to make it much more detailed, the present seemed about the desirable mean between a too condensed and too expanded system. It will undoubtedly make the task of consulting the literature of the Survey much easier in future than ever before.

Very respectfully submitted

ALICE G. DERBY.

Ohio State University, Columbus, July 1906.



**PUBLICATIONS OF THE GEOLOGICAL SURVEY OF OHIO,
AND PUBLIC DOCUMENTS RELATING THERETO,
WITH TOPICAL ANALYSIS OF EACH VOLUME.**

Ohio Executive Documents 1836. Report No. 1. Report of the Committee on a Geological Survey of the State. By S. P. Hildreth, chairman of the committee.

Report of Professor Hildreth, pp. 65-79.

Analysis of the limestone of Cincinnati and Dayton, by John Locke. p. 77-78.

Appendix A. On the application of the hot blast, in the manufacture of cast iron, by Thomas Clark (from Amer. Jour. Sci. for Oct., 1836.) pp. 78-79.

Ohio Executive Documents 1836. pt. 1. Report No. 60. Report of John L. Riddell, M. D., one of the special committee appointed by the last legislature to report on the method of obtaining a complete geological survey of this state.

34p. Contents; Letter of transmittal of Gov. Vance, p. 3.

Report of Mr. Riddell, pp. 3-34, with two plates of sections.

Ohio General Assembly. House of Representatives. Document No. 76. Catalogue of the Geological Specimens collected, on the late survey of the state of Ohio, by W. W. Mather, state geologist. Feb. 25, 1842.

Contents: Letter of transmittal of the governor, Thos. Corwin, to the House, p. 3. Letter of W. W. Mather to the Governor in connection with the report, pp. 5-7. Catalogue of the geological specimens, consisting of 11 sheets on which the report is arranged in tabulated form.

OHIO GEOLOGICAL SURVEY, FIRST ORGANIZATION 1837-38.

First Annual Report || on the || Geological Survey || of the || State of Ohio.

By W. W. Mather, principal geologist, and the several assistants. || Columbus. || Samuel Medary, printer to the state. 1838.

134 pp. 1 plate. 8vo. Bound in black cloth, binder's title, "Ohio Geological Survey. Mather" in gilt on the back. 5,000 copies of this report were printed.

Contents: Title page as above; verso blank; letter of transmittal of Gov. Joseph Vance to the General Assembly; verso blank; plate representing a geological section of the state.

Report of W. W. Mather, principal geologist, pp. 5-23.

Report of Dr. S. P. Hildreth, 1st assistant geologist, pp. 25-63.

Report of Dr. Kirkland, 2d assistant geologist, p. 98.

Report of Mr. Whittlesey, topographer of the Survey, pp. 99-109.

Geological queries, pp. 111-21; glossary of some geological terms used in these reports from Lyell's geology and other sources pp. 123-29; table of contents pp. 130-134.

Ohio General Assembly. Legislative Doc's. Document No. 26.

First Annual Report on the Geological Survey of the State of Ohio. By W. W. Mather, principal geologist, and several assistants. 5,000 copies were ordered printed for distribution among the members.

Second Annual Report || on the || Geological Survey || of the || State of Ohio. By W. W. Mather, || principal geologist, and several assistants. Columbus. || Samuel Medary, printer to the State. || 1838.

1+286 p. illus. 15 plates. 1 folded map. Bound in black cloth, binder's title, "Ohio Geological Survey. Mather." 5,000 copies of this report were printed.

Contents: Title as above; verso blank; letter of transmittal of Gov. Shannon to the General Assembly; verso blank.

Report of W. W. Mather, pp. 5-39.

Report of Mr. Whittlesey, pp. 41-71, with two plates illustrating topography.

Report of Mr. Foster, pp. 73-107, with plate representing geological section.

Report of Mr. Briggs, pp. 109-154, with geological sections.

Report on the Zoology of Ohio, by Prof. J. P. Kirkland, p. 157-200.

Report of Dr. John Locke, pp. 203-286, with sections and a folded map of Ohio.

Ohio General Assembly. Legislative Documents. Document No. 22.

Second annual report on the Geological Survey of the State of Ohio. By W. W. Mather, principal geologist, and the several assistants.

Copies were ordered printed for distribution among the members.

OHIO GEOLOGICAL SURVEY, SECOND ORGANIZATION 1869-88.

Report of Progress, 1869. Title page reads as follows: Geological Survey of Ohio. || Part 1. || Report of Progress in 1869, || by J. S. Newberry, chief geologist. || Part 2. || Report of Progress in the second district, || by E. B. Andrews, || Assistant Geologist. || Part 3. Report on geology of Montgomery county, || by Edward Orton, || assistant geologist. || Columbus. || Columbus Printing Company, state printers. || 1870.

164 p. Illus. Colored maps, 2. 1 chart. 8vo. Bound in cloth, binder's title, Ohio || Geological Survey || 1869. || in gilt on the side. 14,500 copies were printed.

Contents: Preliminary geological map of Ohio, col.; title page as above; verso, letter of transmittal of chief geologist to Gov. Hayes; part 1, Rept. of Progress, by J. S. Newberry, pp. 3-51; errata; chart of Geological History; part 2. Report of progress in the second district, by Prof. E. B. Andrews, assistant geologist, pp. 55-135; part 3, Report on geology of Montgomery County, by Edward Orton, assistant geologist, pp. 139-161; map of grouped sections with explanations, pp. 163-64.

Report of Progress, 1870. Geological Survey of Ohio. || Report of Progress in 1870. || By J. S. Newberry, chief geologist, || including reports by || E. B. Andrews, Edward Orton, J. H. Klippart, assistant geologists. || T. G. Wormley, chemist. G. K. Gilbert, M. C. Read, Henry Newton, W. B. Potter, || local assistants. || Columbus || Nevins and Myers, state printers. || 1871.

568 p. Illus. 6 plates, 1 colored, 1 folded. Svo. Bound in cloth, binder's title, "Geological || Survey || 1870 || Ohio. 14,500 copies of this report were printed.

Contents: Title page as above; verso, letter of transmittal to the Gov. Secondary title, Part 1. Report of Progress of the Geological Survey in 1870. Sketch of the structure of the lower coal measures in northeastern Ohio, by J. S. Newberry, chief geologist; verso blank; Report, pp. 5-53.

Part 2. Report of labors in the second Geological District during the year 1870, by E. B. Andrews; pp. 57-251.

Part 3. Geology of Highland County, by Edward Orton, assistant geologist. Letter of transmittal; colored map of Highland County. Report on Highland County, pp. 255-309. Geological series of Highland County. 6 p.

Part 4. Agricultural Survey, by John H. Klippart, assistant geologist, pp. 313-400.

Part 5. Report of Chemical Department, by T. G. Wormley. Letter of transmittal; Report, pp. 403-462.

Part 6. Sketches of the geology of Geauga and Holmes Counties, by M. C. Read. Letter of transmittal; Report, pp. 465-84.

Part 7. Report on the geology of Williams, Fulton, and Lucas counties, by G. K. Gilbert. Letter of transmittal. Report, pp. 488-99.

Part 8. Sketch of the present state of the iron manufacture in Great Britain. By W. B. Potter, E. M. Letter of transmittal. Report, pp. 503-26.

Part 9. A sketch of the present state of the steel industry. by Henry Newton, E. M. Letter of transmittal. Report, pp. 529-55. Errata.

Index, pp. 557-68.

Part 2 is accompanied by a collection of 5 maps, showing the grouped sections of the Second Geological District.

These are published in a separate envelope.

Report of Progress. 1871. Geological Survey of Ohio. Report of progress for 1871. Printed by order of the General Assembly. 12 pp. 8vo. Unbound.

Contents: Title page as above; letter of transmittal of the Governor to the General Assembly; report of progress of the Geological Survey of Ohio for the year 1871, pp. 3-9; report on the 2d geological district by E. B. Andrews, pp. 11-12.

Geology of Ohio. Report on the Geological Survey of Ohio. Columbus, Ohio. 1873-1894.

7v. in 9. Illus. plates, maps, charts. 8vo. and 4to.

Bound in black cloth, with "Geological Survey of Ohio;" volume title, and volume number on the back, in gilt. The earlier volumes had the seal of the Survey on side, in gilt.

Geology of Ohio. Report of the Geological Survey of Ohio. Volume 1. Geology and Palaeontology. Part 1 Geology. Officers of the Survey. J. S. Newberry, chief geologist; Edward Orton, assistant geologist; E. B. Andrews, assistant geologist; T. G. Wormley, chemist; F. B. Meek, Palaeontologist. Published by authority of the Legislature of Ohio. Columbus, Ohio. Nevins and Myers, state printers. 1873. 5+3+680 p. Illus. 2 plates. Chart 13 maps, 9 colored, 2 folded (col.), 2 black and white. 8vo. Bound in cloth, binder's title, "Geological Survey of Ohio Geology Vol. 1," in gilt on back. Seal of Survey on side in gilt.

Contents: Title page as above; verso, members of the Geological board; Geological Corps, 1689-72. Local and volunteer assistants with complete list of their names. Table of Contents: Part 1—Geology. Section 1—General geology, by J. S. Newberry, pp. 1-167. Section 2—Local geology, pp. 171-645.

Geology of Cuyahoga County. J. S. Newberry. pp. 171-200.

Geology of Summit County. J. S. Newberry. pp. 201-22.

Geology of Gallia County. E. B. Andrews. pp. 25-46.

Geology of Meigs County. E. B. Andrews. pp. 247-60.

Geology of Athens County. E. B. Andrews. pp. 261-93.

Geology of Morgan County. E. B. Andrews. pp. 294-313.

Geology of Muskingum County. E. B. Andrews. pp. 314-64.

Geology of the Cincinnati group. Edward Orton. pp. 365-418.

Geology of Hamilton County. Edward Orton. pp. 419-34.

Geology of Clermont County. Edward Orton. pp. 435-49.

Geology of Clark County. Edward Orton. pp. 450-80.

Geology of Ashtabula County. M. C. Read. pp. 481-92.

Geology of Trumbull County. M. C. Read. pp. 493-509.

- Geology of Lake County. M. C. Read. pp. 510-19.
 Geology of Geauga County. M. C. Read. pp. 520-33.
 Surface geology of the Maumee Valley. G. K. Gilbert. pp. 535-56.
 Geology of Williams County. G. K. Gilbert. pp. 557-66.
 Geology of Fulton County. G. K. Gilbert. pp. 567-72.
 Geology of Lucas County. G. K. Gilbert. pp. 573-87.
 Geology of West Sister Island. G. K. Gilbert. pp. 588-90.
 Geology of Sandusky County. N. H. Winchell. pp. 593-610.
 Geology of Seneca County. N. H. Winchell. pp. 611-24.
 Geology of Wyandot County. N. H. Winchell. pp. 625-39.
 Geology of Marion County. N. H. Winchell. pp. 640-45.
 List of illustrations of part 1.
 Secondary title, Geological Survey of Ohio. Vol. 1, Part 1.
 Section 1. The general geological relations and structure of Ohio.
 Table of errata.
 Reports.
 Appendix A. Tables of temperature and rainfall. pp. 650-65.
 Appendix B. Profiles of railroads and canals. pp. 666-72.
 Index to Vol. 1, Part 1. pp. 673-80.

Accompanying this volume is a portfolio of maps, five in number, representing geological sections of the state. This volume is also printed in German.

Geology of Ohio. Vol. 1. Part. 2. Report of the Geological Survey of Ohio. Volume 1. Geology and Palaeontology. Part 2. Palaeontology. Officers of the Survey; J. S. Newberry, chief geologist; Edward Orton, assistant geologist; E. B. Andrews, assistant geologist; T. G. Wormley, chemist; F. B. Meek, palaeontologist. Published by the Legislature of Ohio. Columbus, Nevins & Myers, state printers. 1873.

13+2+399+3 pages and 48 plates. Illus. 4to. Bound in cloth, binder's title, "Geological Survey of Ohio. Palaeontology. Vol. 1," in gilt on the back. Seal of the Survey in gilt on the side. 20,000 copies printed.

Contents: Title page as above; verso blank; Members of the Geological Board; Geological Corps; and local and volunteer assistants; verso blank; Table of contents; verso blank.

Preface, by J. S. Newberry, pref. pp. vii-xiii.

Secondary title, Geological Survey of Ohio. Vol. 1. Part 2. Palaeontology.

Section 1. Descriptions of invertebrate fossils of the Silurian and Devonian systems, by F. B. Meek. Letter of transmittal; Report, pp. 1-243.

Section 2. Descriptions of fossil fishes, by J. S. Newberry. pp. 247-355.

Section 3. Descriptions of fossil plants, by J. S. Newberry.
pp. 359-85.

Index, pp. 387-99.

Errata.

Diagrams of Crinoids, 3 pp.

Plates.

This volume was also printed in German.

Geology of Ohio. Vol. 2. Part 1. Report of the Geological Survey of Ohio. Volume 2. Geology and Palaeontology. Part 1. Geology. Officers of the Survey. J. S. Newberry, chief geologist; E. B. Andrews, assistant geologist; Edward Orton, assistant geologist; T. G. Wormley, chemist; F. B. Meek, palaeontologist. Published by authority of the state of Ohio. Columbus, Ohio. Nevins & Myers, state printers. 1874.

15+701 pp. Illus. Plates, maps, col. and plain. 8vo. Bound in cloth, binder's title, "Geological Survey of Ohio. Geology. Vol. ii," in gilt, on the back. Seal of the Survey on the side, in gilt. 20,000 copies printed.

Contents: Plate of glacial markings, frontispiece; title page as above; verso blank; table of contents, pp. v-vii; preface, by J. S. Newberry, pp. ix-xv.

Section 1. General geology. Surface geology, by J. S. Newberry, pp. 1-80.

The Carboniferous system, by J. S. Newberry pp. 81-180.

Section 2. Local geology. pp. 183-696.

Geology of Erie County and the Islands. J. S. Newberry. pp. 183-205.

Geology of Lorain County. J. S. Newberry. pp. 206-24.

Geology of Ottawa County. N. H. Winchell. pp. 227-35.

Geology of Crawford County. N. H. Winchell. pp. 236-52.

Geology of Morrow County. N. H. Winchell. pp. 253-71.

Geology of Delaware County. N. H. Winchell. pp. 272-313.

Geology of Van Wert County. N. H. Winchell. pp. 314-23.

Geology of Union County. N. H. Winchell. pp. 324-34.

Geology of Paulding County. N. H. Winchell. pp. 335-51.

Geology of Hardin County. N. H. Winchell. pp. 352-57.

Geology of Hancock County. N. H. Winchell. pp. 358-67.

Geology of Wood County. N. H. Winchell. pp. 368-86.

Geology of Putnam County. N. H. Winchell. pp. 387-96.

Geology of Allen County. N. H. Winchell. pp. 397-403.

Geology of Auglaize County. N. H. Winchell. pp. 404-09.

Geology of Mercer County. N. H. Winchell. pp. 410-14.

Geology of Henry County. N. H. Winchell. pp. 415-21.

Geology of Defiance County. N. H. Winchell. pp. 422-38.

- Surface geology of southeastern Ohio. E. B. Andrews. pp. 441-52.
- Geology of Washington County. E. B. Andrews. pp. 453-508.
- Geology of Noble County. E. B. Andrews. pp. 509-28.
- Geology of Guernsey County (southern half). E. B. Andrews. pp. 529-42.
- Geology of Belmont County (southern half). E. B. Andrews. pp. 543-69.
- Geology of Monroe County. E. B. Andrews. pp. 570-87.
- Geology of Pickaway and Fairfield Counties. E. B. Andrews. pp. 588-608.
- Geology of Pike County. Edward Orton. pp. 611-41.
- Geology of Ross County. Edward Orton. pp. 642-58.
- Geology of Greene County. Edward Orton. pp. 659-96.
- Index pp. 697-701.

Accompanying this volume is a collection of 4 maps, representing geological sections of local geology; 4 charts representing geological structure of large divisions of Ohio; 2 charts of palaeontological specimens.

This volume is also found in the German edition, contents being similar to the English edition.

Geology of Ohio. Vol. 2. Part 2. Report of the Geological Survey of Ohio. Volume II. Geology and Palaeontology. Part II. Palaeontology. Officers of the Survey; J. S. Newberry, chief geologist; E. B. Andrews, assistant geologist, Edward Orton, assistant geologist; T. G. Wormley, chemist; F. B. Meek, palaeontologist. Published by authority of the Legislature of Ohio. Columbus; Nevins & Myers, state printers, 1875.

8+435 pp.+59 plates. Illus. 4to. Bound in cloth, binder's title, "Geological Survey of Ohio. Palaeontology. Vol. II." in gilt, on the back; seal of the Survey on the side. 20,000 copies of this volume were printed.

Contents: Title page as above; members of the Geological Board, Geological Corps, and local and special assistants; table of contents; verso blank.

Preface, by J. S. Newberry, pp. v-viii;

Descriptions of fossil fishes, by J. S. Newberry, pp. 1-64.

Descriptions of Silurian fossils, by James Hall and R. P. Whitfield, pp. 65-161.

Descriptions of Crinoidea from the Waverly Group, by James Hall and R. P. Whitfield, pp. 162-179.

Descriptions of the Corals of the Silurian and Devonian Systems, by H. H. Alleyne Nicholson, pp. 181-286.

Descriptions of Invertebrate Fossils from the Carboniferous System, by F. B. Meek, pp. 269-347.

Synopsis of the Extinct Batrachia from the Coal Measures
by E. D. Cope, pp. 349-411.

Descriptions of Fossil Plants from Lower Carboniferous strata,
by E. B. Andrews, p. 413-426.

Index pp. 427-35.

59 illustrative plates.

This volume is also found in the German edition. The contents are similar to the English edition.

Geology of Ohio, Volume 3. Report of the Geological Survey of Ohio. Volume III. Geology and Palaeontology.

Part 1, Geology. Officers of the Survey: J. S. Newberry, chief geologist; E. B. Andrews, assistant geologist; Edward Orton, assistant geologist; T. G. Wormley, chemist; F. B. Meek, palaeontologist. Published by the authority of the Legislature of Ohio. Columbus; Nevins & Myers, state printers, 1878.

i+958 p. illus. plates, maps, col., 8vo. Bound in cloth, binder's title, "Geological Survey of Ohio. Geology. Vol. III," in gilt on the back. Seal of the Survey on the side. 20,000 copies of this report were printed.

Contents: Title page as above; members of the Geological Board, Corps, and local and special assistants; Table of Contents, p. iii-v; Preface, by J. S. Newberry, p. vii-viii. Part i, Geology. Section 1, General Geology. Review of Geological structure of Ohio, by J. S. Newberry, pp. 1-51. Section 2, Local Geology, pp. 52-944.

Geology of Tuscarawas County. J. S. Newberry. pp. 52-89.

Geology of Columbiana County. J. S. Newberry. pp. 90-132.

Geology of Portage County. J. S. Newberry. pp. 133-50.

Geology of Stark County. J. S. Newberry. pp. 151-76.

Geology of Carroll County. J. J. Stevenson. pp. 177-99.

Geology of Harrison County. J. J. Stevenson. pp. 200-18.

Geology of Guernsey County. J. J. Stevenson. pp. 219-36.

Geology of Muskingum County. J. J. Stevenson. pp. 237-60.

Geology of Belmont County. J. J. Stevenson. pp. 261-87.

Geology of Huron County. M. C. Read. pp. 289-309.

Geology of Richland County. M. C. Read. pp. 310-24.

Geology of Knox County. M. C. Read. pp. 325-47.

Geology of Licking County. M. C. Read. pp. 348-61.

Geology of Medina County. A. W. Wheat. pp. 362-80.

Geology of Warren County. Edward Orton. pp. 381-91.

Geology of Butler County. Edward Orton. pp. 392-403.

Geology of Preble County. Edward Orton. pp. 404-19.

Geology of Madison County. Edward Orton. pp. 420-28.

Geology of Clinton and Fayette Counties. J. Hussey. pp. 429-47.

- Geology of Shelby County. J. Hussey. pp. 448-67.
 Geology of Miami County. J. Hussey. pp. 468-81.
 Geology of Logan County. F. C. Hill. pp. 482-90.
 Geology of Champaign County. F. C. Hill. pp. 491-95.
 Geology of Darke County. A. C. Lindemuth. pp. 496-518.
 Geology of Ashland County. M. C. Read. pp. 519-28.
 Geology of Wayne County. M. C. Read. pp. 529-39.
 Geology of Holmes County. M. C. Read. pp. 540-61.
 Geology of Coshocton County. J. T. Hodge. pp. 562-95.
 Geology of Franklin County. Edward Orton. pp. 596-646.
 Geology of Hocking Valley Coal Field. M. C. Read. pp. 647-715.
 Geology of Jefferson County. J. S. Newberry. pp. 716-80.
 Geology of Mahoning County. J. S. Newberry. pp. 781-814.
 Supplemental Report on Perry County and Portions of Hocking
 and Athens Counties. E. B. Andrews. pp. 815-82.
 Supplemental Report on the Hanging Rock District. Edward
 Orton. pp. 883-941.
 Geology of Brown County. H. Herzer. pp. 942-44.
 Index, pp. 944-54.
 Illustrations of volume 3, Geology, pp. 955-56.
 Errata, pp. 957-58.

This volume is accompanied by geological atlas.

Volume 3, part 1, is printed in the German edition, the contents being similar to the English edition.

Geological Atlas of Ohio, to accompany Vol. 3. 1879.

Geological Survey of Ohio. Geological atlas of the state of Ohio prepared by J. S. Newberry, chief geologist. Published by authority of the legislature of Ohio, 1879.

Contents: Geological map of the state in sections.

Volume 4. Chart No. 2. Sections of shafts and slopes in the Mahoning Valley coal field, is sometimes bound with the Geological atlas.

Geology of Ohio. Vol. 4. Part I. Report of the Geological Survey of Ohio. Volume 4. Zoology and Botany. Part 1 Zoology. Officers of the Survey: J. S. Newberry, chief geologist; Edward Orton, assistant geologist; E. B. Andrews, assistant geologist; T. G. Wormley, chemist; F. B. Meek, palaeontologist; special assistants in Zoology and Botany: J. M. Wheaton, A. W. Brayton, H. C. Beardlee, D. S. Jordan, W. H. Smith, R. M. Byrnes. Published by the authority of the legislature of Ohio. Columbus, Nevins & Myers, state printers. 1882.

viii+1020 p. 8vo. Bound in black cloth, binder's title, "Geological Survey of Ohio. Zoology and Botany. Volume iv," in gilt on the back. 20,000 copies of this report were printed.

Contents: Title page as above; verso blank; table of contents; Part 1—Zoology, verso blank; preface, pp. v-viii.

Section 1. Report on the Mammalia of Ohio, by A. W. Brayton, p. 1-185.

Section 2. Report on the Birds of Ohio, by J. M. Wheaton, M. D., pp. 187-628.

Section 3. Report on the Reptiles and Amphibians of Ohio, by W. H. Smith, M. D., Ph. D., pp. 629-734.

Section 4. Report on the Fishes of Ohio, by David S. Jordan, M. D., pp. 735-1002.

Index pp. 1003-1020.

A German edition of this volume was printed, 1883, the contents being similar with the addition of "Vorrede des Uebersetzers zur deutschen Ausgabe."

Geology of Ohio. Vol. 5. Report of the Geological Survey of Ohio. Volume V. Economic Geology. Published by authority of the legislature of Ohio Under the supervision of the state geologist. Columbus. G. J. Brand & Co., state printers. 1884.

16+1124 pp. Illus. Plates, tables, maps, 8vo. Bound in cloth, binder's title, "Geological Survey of Ohio. Economic Geology Volume V," in gilt on the back. Accompanying this volume is a collection of 8 maps representing the coal fields and counties of the state.

Contents: Title page as above; verso blank; officers of the Survey; Edward Orton, state geologist; N. W. Lord, chemist; assistants, J. N. Bradford, Mech. Eng., C. Newton Brown, Edward C. Downer, John J. Dun, E. M., Frederick Keffer, E. M., Ellis Lovejoy, Emerson McMillin, Edward Orton, Jr., E. M., Willis J. Root, Hon. Andrew Roy, Frederick W. Sperr, E. M., Prof. Albert A. Wright, Prof. G. Frederick Wright; verso blank; Preface by Edward Orton, pp. v-xi; table of contents, pp. xii-xiii; list of illustrations, pp. xiv-xvi;

Chap. 1. The stratigraphical order of the lower coal measures of Ohio, by Edward Orton, pp. 1-128.

Chap. 2. The coal seams of the lower coal measures of Ohio, in part, by Edward Orton, pp. 129-168.

Chap. 3. Chapter 2 cont. pp. 169-300.

Chap. 4. Coal Mining in Ohio, by Andrew Roy, State Inspector of Mines, pp. 301-370.

Chap. 5. The iron ores of Ohio, by Edward Orton, pp. 371-435.

Chap. 6. Iron manufacture of Ohio, by N. W. Lord, pp. 438-554

Chap. 7. The manufacture of coke, by Henry Newton, pp. 555-76.

Chap. 7. Building stones of Ohio, from notes of Prof. Orton, pp. 578-642.

- Chap. 8. The clays of Ohio, and the industries founded upon them, by Edward Orton, Jr., pp. 643-721.
- Chap. 10. The gas coals of Ohio, by Emerson McMillin, pp. 722-49.
- Chap. 11. The glacial boundary in Ohio, by Prof. G. Fred. Wright, pp. 750-72.
- Chap. 12-18. The coal seams of the lower coal measures of Ohio (cont.) by Edward Orton and Albert A. Wright, pp. 773-1058.
- Chap. 19. The Meigs Creek coal seam in Morgan, Muskingum, Guernsey and Noble Counties, by C. Newton Brown, pp. 1059-1087.
- Chap. 29. Report of the chemical department, by N. W. Lord, pp. 1087-98.
- Tables of analysis, pp. 1099-1113.
- Index, pp. 1115-24.

Preliminary report on petroleum, 1886. Geological Survey of Ohio || Preliminary report || upon || Petroleum and inflammable gas || by || Edward Orton, state geologist. || Published by authority of the legislature. || Columbus, Ohio. || The Westbote Co., state printers. || 1886.

76+3 pp. Illus. 2 folded maps. Bound in cloth. 2,500 copies of this report were printed.

Contents: Title page as above;

Report, pp. 3-76.

Index, 3 pp.

(2) Geological Survey of Ohio. || Preliminary report upon petroleum and inflammable gas, || by Edward Orton, state geologist. || Reprinted for the author || with a supplement || Col. O. || A.H.Smythe, || 1887.

200 pp. Illus. 2 folded maps. Bound in cloth, binder's title, "Preliminary Report || Petroleum and Gas || Orton" || in gilt on the side.

Contents: Title as above; Copyright by Edward Orton.

Preface, pp. 3-4.

Report, pp. 5-110.

Secondary title; Supplement to Preliminary report published in 1888 on petroleum and inflammable gas by Edward Orton, state geologist. April, 1887.

Contents: Report, pp. 115-93.

Index to preliminary report pp. 195-97.

Index to supplementary report pp. 198-200.

Geology of Ohio. Vol. VI. Report || of the || Geological Survey || of Ohio. || Volume VI. || Economic Geology. || Published by the authority of the legislature of Ohio || Under the supervision of the state geologist. || Columbus. || The Westbote Co., state printers. || 1888. ||

10+831 pp. Illus. plates, maps. 8vo. Bound in cloth, binder's title, "Geological Survey of Ohio. Economic Geology, Volume VI." in gilt, on the back. 2,500 copies of this report were printed.

Contents: Title page as above; verso blank; officers of the Survey. Edward Orton, state geologist; N. W. Lord, chemist; assistants, F.W. Minshall, F. H. Newell, Emerson McMillin, C. Newton Brown, S. W. Robinson, Ellis Lovejoy, Willis J. Root, M. R. Campbell, draughtsman; verso blank; preface, pp. v-viii; table of contents, p. ix; list of illustrations and maps, p. x.

Chap. 1. The geology of Ohio considered in its relation to petroleum and natural gas, by Edward Orton, p. 1-59.

Chap. 2. The origin and accumulation of petroleum and natural gas by Edward Orton, pp. 60-100.

Chap. 3. The Trenton limestone as a source of oil and gas in Ohio, by Edward Orton, pp. 101-310.

Chap. 4. Berea grit as a source of oil and gas in Ohio, by Edward Orton, pp. 311-409.

Chap. 5. The Ohio shale as a source of oil and gas in Ohio, by Edward Orton, pp. 410-42.

Chap. 6. The history and development of the Macksburg oil field, by F. W. Minshall, pp. 443-75.

Chap. 7. The drilling and care of oil wells, by Fred H. Newell, pp. 476-515.

Chap. 8. The transportation, uses and modes of using natural gas, by Emerson McMillin, pp. 516-46.

Chap. 9. Measurement of gas wells, and other gas streams, and the piping of natural gas, by Prof. S. W. Robinson, pp. 548-94.

Chap. 10. The Pittsburg coal seam in Jefferson, Belmont, and Guernsey Counties, by Prof. C. Newton Brown, pp. 595-626.

Chap. 11. The Pomeroy and Federal Creek coal field, by Ellis Lovejoy, pp. 627-652.

Chap. 12. The manufacture of salt and bromine, by W. J. Root, pp. 653-70.

Chap. 13. Natural and artificial cements, by N. W. Lord, pp. 671-95.

Chap. 14. Gypsum or land plaster in Ohio, by Edward Orton, pp. 696-702.

Chap. 15. The production of lime in Ohio, by Edward Orton, pp. 703-72.

Chap. 16. The drift deposits of Ohio, by Edward Orton, pp. 772-82.

Chap. 17. Supplemental report on the new gas fields and oil of Ohio, by Edward Orton, pp. 783-92.

Appendix. Table of elevations in Ohio, pp. 793-820.
Index pp. 821-31.

Accompanying this volume is a collection of 4 maps, consisting of a geological map of Ohio, oil and gas fields of certain counties, and certain geological structure of the state. Title is "Maps. Geology of Ohio—Volume 6. Edward Orton, state geologist, 1888."

OHIO GEOLOGICAL SURVEY, THIRD ORGANIZATION 1889-93.

First Annual Report || of the || **Geological Survey of Ohio** || (Third Organization) By Edward Orton, state geologist || Published by authority of the legislature. || Columbus, Ohio. || The Westbote Co., state printers. || 1890.

6+(2)+323 pp. Plates. Bound in cloth, binder's title, "Geological Survey of Ohio, 1890. Orton," in gilt on the back.

Contents: Title page as above; verso blank; officers of the Survey; verso blank; preface, pp. v-vi; table of contents; list of illustrations and maps; secondary title, Geological Survey of Ohio Annual report, 1890.

Introduction, pp. 1-8.

Chap. 1. Geological scale and geological structure in Ohio, pp. 9-54.

Chap. 2. Origin and accumulation of petroleum and natural gas, pp. 55-104.

Chap. 3. The Trenton limestone as a source of oil and gas, pp. 105-226.

Chap. 4. The Clinton limestone as a source of oil and gas, pp. 227-47.

Chap. 5. Remaining sources of oil and gas in Ohio, pp. 248-58.

Chap. 6. The utilization of oil and gas in Ohio, pp. 259-80.

Chap. 7. The measurement of natural gas, by S. W. Robinson, pp. 281-395.

Chap. 8. The Wood County oil field, pp. 306-315.

Index pp. 316-23.

With this volume are two maps of the oil and gas fields of certain specified counties of Ohio.

Geology of Ohio. Vol. VII. Report || of the || Geological Survey || of Ohio || Volume VII. || Economic Geology. || Archaeology. || Botany. || Palaeontology. || Published by authority of the legislature of Ohio. || Norwalk, Ohio. || The Laning Co., state printers. || 1893-4.

16+290+700 pp.+56 plates. Illus. plates, map. Bound in cloth, binder's title, "Geological Survey of Ohio. Geology. Vol. VII," in gilt, on the back. 7,500 copies of this report were printed. This is the complete Volume VII, containing both parts 1 and 2.

Contents: Frontispiece, geological map of Ohio; title page as above; verso blank; officers of the Survey; verso blank; preface by Edward Orton, pp. v-xvi; contents, list of illustrations and maps.

Part 1. Economic.

Chap. 1. Geological scale and geological structure of Ohio, by Prof. Edward Orton, pp. 3-41.

Chap. 2. The clays of Ohio, their origin, composition, and variety, by Prof. Edward Orton, pp. 45-68.

Chap. 3. The clay working industries of Ohio, by Edward Orton, Jr., pp. 69-254.

Chap. 4. The coal fields of Ohio, by Prof. Edward Orton, pp. 255-290.

Part 2. General.

Chap. 1. The archaeology of Ohio, by Gerard Fowke, pp. 3-55.

Chap. 2. The botany of Ohio, Prof. W. A. Kellerman and W. C. Werner, pp. 56-406.

Chap. 3. Contributions to the palaeontology of Ohio. Prof. R. T. Whitfield, pp. 407-94.

Chap. 4. Observations on the so-called Waverly group of Ohio. Prof. C. L. Herrick, pp. 495-515.

Chap. 5. Fossils of the Clinton group in Ohio and Indiana. Aug. F. Foerste, pp. 516-601.

Chap. 6. The fossil fishes of Ohio. Profs. E. W. Claypole and A. A. Wright, pp. 602-26.

Chap. 7. New and little known Lamellibranchiata from the Lower Silurian rocks of Ohio and adjacent states. E. O. Ulrich, pp. 627-93.

General index, pp. 695-97.

Palaeontological index, pp. 698-700.

Palaeontological plates, 56.

Accompanied by a collection of 10 maps representing "Outcrop boundaries of principal coal seams." Title, "1893. Geology of Ohio. Vol. VII. Edward Orton, state geologist." Belongs to Vol. VII. Part 1, only.

OHIO GEOLOGICAL SURVEY—FOURTH SERIES. 1903.

Report of Petroleum and Natural Gas in Ohio. Geological Survey of Ohio || Edward Orton, Jr., State Geologist. || Fourth Series, Bulletin No. 1. || The || Occurrence and exploitation || of || Petroleum and Natural Gas || in Ohio, || by John Adams Bownocker, D. Sc., || Professor of Inorganic Geology Ohio State University. || Published under the authority of the legislature of Ohio, under the || supervision of the State Geologist. || Columbus, Ohio, December, 1903.

xxii+325 pp. Plates, maps. Bound in cloth, binder's title, "Geological || Survey || of || Ohio || Fourth series || Bulletin 1 || Oil || and || Gas || Bownocker || 1903."

Contents: Title page as above; verso, printer's notice; letter of transmittal to the Governor; list of officers of the Survey.

The organization and work of the Geological Survey of Ohio, by Prof. Edward Orton, Jr., State Geologist, pp. i-xxii.

Secondary title page; letter of transmittal of Professor Bownocker to the state geologist; contents of the report; list of illustrations.

Report on the oil and gas producing rocks of Ohio, by J. A. Bownocker, pp. 17-320.

Index, pp. 321-325.

Report on uses of Hydraulic cement. Geological Survey of Ohio, || Edward Orton, Jr., State Geologist. || Fourth Series, Bulletin No. 2. || The || Uses of Hydraulic Cement || by Frank Harvey Eno, C. E. || Associate Professor of Civil Engineering, Ohio State University. || Published by authority of the legislature of Ohio, under the supervision of the state geologist. || Columbus, Ohio, September, 1904.

16+260 pp. Illus. Bound in cloth, binder's title, "Geological Survey of Ohio, Fourth Series, Bulletin No. 2. Uses of Hydraulic cement, Eno, 1904."

Contents: Title page as above; verso, printer's notice; letter of transmittal to the Governor; list of officers of the Survey. Announcements by the state geologist, pp. viii-xvi. Secondary title page; verso blank; letter of transmittal of Professor Eno, to state geologist; table of contents; pp. 5-7; tables, p. 8; list of illustrations, pp. 9-12; Author's introduction, pp. 13-15.

Report, pp. 17-248.

Chap. 1. Brief history of cement, pp. 17-22.

Chap. 2. Uses of cement in mortars, pp. 23-62.

Chap. 3. Uses of cement in concrete, pp. 63-123.

Chap. 4. Uses of cement in reinforced concrete, pp. 124-88

Chap. 5. Specifications for concrete materials, pp. 189-222.

Chap. 6. Machinery and tools, pp. 223-48.

Index, pp. 249-60.

Manufacture of Cements. Geological Survey of Ohio. || Edward Orton, Jr., State Geologist. || Fourth series, Bulletin No. 3. || The || Manufacture || of || Hydraulic Cements, || by || Albert Victor Bleining, B. Sc., || Instructor in Ceramics, Ohio State University. || Published by authority of the legislature of Ohio, under the || supervision of the state geologist. || Columbus, Ohio, December, 1904.

14+(2)+391 pp. Illus. 2 pl.

Contents: Title page as above; verso, printer's notice; letter of transmittal to the Governor; verso blank; list of officers of the Survey; announcements by the state geologist; pp. vii-xiv; secondary title page; verso blank; letter of transmittal of Mr. Bleining

to state geologist; table of contents, pp. 13-19; illustrations, pp. 19-21; Author's preface, pp. 23-24; Report on the manufacture of cements, pp. 25-378.

Chap. 1. General considerations on the hydraulic cements, pp. 25-40.

Chap. 2. Raw materials of the cement industry, pp. 41-101.

Chap. 3. Chemical and Physical examination of cement materials, pp. 102-57.

Chap. 4. Manufacture of Pozzuolane and natural cements, pp. 158-96.

Chap. 5. On the nature of Portland cement, pp. 197-222.

Chap. 6. The compounding of Portland cement mixtures, pp. 223-47.

Chap. 7. Winning and preparation of the raw materials, pp. 248-87.

Chap. 8. The Burning of Portland cement—The grinding of the clinker and general arrangement of plants, pp. 288-335.

Chap. 9. The properties of Portland cement and the testing of cement, pp. 336-78.

Index, pp. 381-91.

Geology of Ohio, Volume VIII. Geological Survey of Ohio. Economic Geology. Volume VIII. 1906.

Report of the Geological Survey of Ohio. Volume VIII.

Comprising reports on various mineral industries. Published by authority of the legislature of Ohio, under the supervision of Edward Orton, Jr., state geologist. Columbus, Ohio, January, 1906. Binding similar to rest of set.

Contents: Title page as above; Letter of transmittal from state geologist to Governor; Organization and work of state geologist.

Bulletin 1. The occurrence and exploitation of petroleum and natural gas in Ohio, by John Adams Bownocker, D. Sc.

Bulletin 2. Uses of hydraulic cements, by Frank Harvey Eno, C. E.

Bulletin 3. The manufacture of hydraulic cements, by Albert Victor Bleininger, B. Sc.

Limestones and Lime Industry of Ohio. Geological Survey of Ohio. Edward Orton, State Geologist. Fourth series, Bulletin No. 4. The Limestones and Lime Industry of Ohio, by Edward Orton, Jr., and S. V. Peppel. Published by authority of the legislature of Ohio, by state geologist. Columbus, Ohio, July, 1906.

365 pp. Illus. Bound in cloth, with Bulletin No. 5. 4,000 copies printed.

Contents: Title page as above; verso, printer's notice; letter of transmittal to the Governor; officers of the Survey; announcements by state geologist, p. vii; Letter of transmittal, p. 3; table of contents, p. 5; table of illustrations, p. 11; preface, p. 13; Report, p. 17-365.

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Chap. 3. The composition of the limestones of Ohio, with special reference to their fitness for portland cement manufacture. Edward Orton, Jr., pp. 31-136.

Chap. 4. The composition, physical character, and uses of the limestones of Ohio, considered by geological formations. Edward Orton, Jr., and S. V. Peppel, pp. 137-211.

Chap. 5. The uses of limestone in Ohio. S. V. Peppel, pp. 212-248.

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Appendix. Description and drawings of some of the typical lime manufacturing plants in Ohio, by S. V. Peppel. pp. 342-365.

Manufacture of Artificial Sandstone or Sand-lime Brick. Geological Survey of Ohio. || Edward Orton, Jr., State Geologist. || Fourth series, Bulletin No. 5. || The Manufacture || of || Artificial Sandstone || or || Sand-lime Brick, || by || Samuel Vernon Peppel, B. Sc. || Springfield, Ohio. || The Springfield Publishing Company, || state printers. || 1905. || 79 p. Illus. Bound in cloth, with Bulletin No. 4. 4,000 copies printed.

Contents: Title page as above; letter of transmittal of Mr. Peppel to the state geologist; verso blank; table of contents; list of illustrations; preface by state geologist, pp. 9-11; verso blank; preface by author, p. 13; verso blank; introduction, pp. 15-16; report, pp. 17-79.

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Bibliography of Ohio Geology. Geological Survey of Ohio || Edward Orton, Jr., State Geologist || Fourth Series, Bulletin No. 6. || A Bibliography of Ohio Geology || Part One || A Subject Index of the Publications of the Geological Survey || of Ohio, from its Inception to and including Bulletin || Eight of the Fourth Series || By || Alice Greenwood Derby, B. Ph., B. A. || Part Two || A Bibliography of the publications relating to the Geology of || Ohio, other than those of the State || Geological survey. || By || Mary Wilson Prosser. || Published by authority of the Legislature of Ohio, under the supervision || of the State Geologist || Columbus, Ohio, August, 1906. ||

332 pages. Bound in cloth. 3,500 copies printed.

Contents: Title page as above; verso, printers' notice; letter of transmittal to the Governor; officers of the Survey; announcements by the State Geologist, pp. 7-14; title page, Part One; letter of transmittal from Miss Derby to State Geologist, p. 17. Topical analysis of each volume of the publications of the Geological Survey of Ohio and public documents relating thereto, pp. 19-37; Subject Index, p. 38.

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Revised Nomenclature of Ohio Geological Formations. Geological, Survey of Ohio. || Edward Orton, Jr., State Geologist. || Fourth series || Bulletin No. 7. || Revised Nomenclature of the Ohio || Geological Formations || by || Charles S. Prosser, M. Sc., || Professor of Geology, Ohio State University. || Published by authority of the legislature of Ohio, under the supervision of || the state geologist. || Columbus, Ohio, November, 1905. ||

16+36 p. Bound in paper; printer's title. 3,500 copies printed.

Contents: Title page as above; letter of transmittal of state geologist to the Governor; p. iii; verso blank; officers of the Survey; announcements by the state geologist, pp. vii-viii; report of state geologist, pp. ix-xv. Report on the revised nomenclature of the Ohio geological formations, pp. 1-36.

Salt Deposits and the Salt Industry in Ohio. Geological Survey of Ohio. || Edward Orton, Jr., State Geologist. || Fourth series, Bulletin No. 8. || Salt deposits and the salt industry in Ohio, || by || John Adams Bownocker, D. Sc., || Professor of Geology, Ohio State University. || Published by authority of the legislature of Ohio, under the supervision of the state geologist. || Columbus, Ohio, June, 1906. ||

16+42 p. Illus. Map.

Contents: Title page as above; printer's notice; letter of transmittal of state geologist to the Governor; blank page; officers of the Survey; blank; preface by the state geologist, pp. vii-viii; announcements by state geologist, pp. ix-xvi; secondary title page; letter of transmittal of Professor Bownocker to state geologist, p. 3; table of contents, p. 5; table of illustrations, p. 7; map of eastern Ohio showing salt works. p. 8.

Report, pp. 9-41.

Appendix, pp. 41-42.

ABREVIATIONS USED IN THE TEXT.

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|--|---|
| Annual Report, Mather. Volume 1, 1838. | Ann. rep. v. 1. |
| Annual Report, Mather. Volume 2, 1838. | Ann. rep. v. 2. |
| Report of Progress, 1869, Newberry. | Rep. Prog. 1869. |
| Report of Progress, 1870, Newberry. | Rep. Prog. 1870. |
| Report of Progress, 1871, Newberry. | Rep. Prog. 1871. |
| Geology of Ohio. Newberry, Orton. | Geol. of O., v. 1-8. |
| First Annual Report (3rd organization.)
Orton, 1890. | Rep. 1890. |
| Preliminary Report on Petroleum and Inflam-
mable Gas, Orton, 1886-1887. | Prelim. rep. on petrol.
and inflam. gas. |
| Bulletin 1. Occurrence and Exploitation of
Petroleum and Natural Gas in Ohio.
Bownocker, 1903. | O. Geol. Sur. Bull. 1. |
| Bulletin 2. The uses of Hydraulic Cement,
Eno, 1904. | O. Geol. Sur. Bull. 2. |
| Bulletin 3. The Manufacture of Hydraulic
Cements. Bleininger, 1904. | O. Geol. Sur. Bull. 3. |
| Bulletin 4. Limestones and Lime Industry
of Ohio. Orton, Jr., and Peppel, 1906. | O. Geol. Sur. Bull. 4. |
| Bulletin 5. Manufacture of Artificial Sand-
stone or Sand-lime Brick. Peppel,
1905. | O. Geol. Sur. Bull. 5. |
| Bulletin 6. Bibliography. 1906. | |
| Part 1. Subject index of the publica-
tions of geological survey. Alice
G. Derby. | |
| Part 2. Bibliography of Ohio geol-
ogy. Mary Wilson Prosser. | O. Geol. Sur. Bull. 6. |
| Bulletin 7. Revised Nomenclature of Ohio
Geological Formations. Prosser, 1905. | O. Geol. Sur. Bull. 7. |
| Bulletin 8. Salt Deposits and the Salt In-
dustry in Ohio. Bownocker, 1906. | O. Geol. Sur. Bull. 8. |

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- Wheat. Ancient mounds in Medina county. Geol. of O., v. 3, pp. 369-71, 374-75, 375-76.
- Whittlesey. Ancient works in region between the Scioto and Hockhocking rivers. Ann. rep., v. 1, 1837, pp. 104-6.
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- Abutments.** Eno. Use of concrete in abutments. O. Geol. Sur., Bull. 2, pp. 66-68.
- Acid Slaking Process.** Peppel. Acid slaking process in manufacture of sand-lime brick. O. Geol. Sur., Bull. 5, pp. 21-22.
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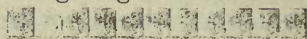
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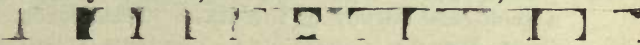
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BULLETIN NUMBER SIX

PART TWO

A BIBLIOGRAPHY OF THE PUBLICATIONS RELATING TO THE
GEOLOGY OF OHIO OTHER THAN THOSE OF THE
STATE GEOLOGICAL SURVEY.

BY
MARY WILSON PROSSER.

LETTER OF TRANSMITTAL

PROF. EDWARD ORTON, JR., *State Geologist, Columbus, Ohio:*

SIR :—I have the honor to transmit herewith the manuscript for Part II, Bulletin Number Six, of the Geological Survey of Ohio, entitled "A Bibliography of the publications relating to the geology of Ohio other than those of the State Geological Survey."

Yours respectfully,

MARY WILSON PROSSER.



INTRODUCTION

Having on hand, for private use, some three hundred references to the geology of Ohio, I was requested by Professor Edward Orton, Jr., State Geologist, to complete the bibliography as a natural accompaniment to Part I, of this Bulletin. The work was undertaken, but must, on account of limited time, necessarily be regarded as little more than preliminary. In this connection I wish to state that I will be under great obligation if persons interested in this work will send in any further references to articles which have been overlooked.

I desire to take advantage of this opportunity to acknowledge my indebtedness to the Bibliographic Bulletins of the United States Geological Survey, to Mr. F. B. Weeks, Mr. Jesse E. Hyde and to all others who have kindly assisted me.

M. W. P.

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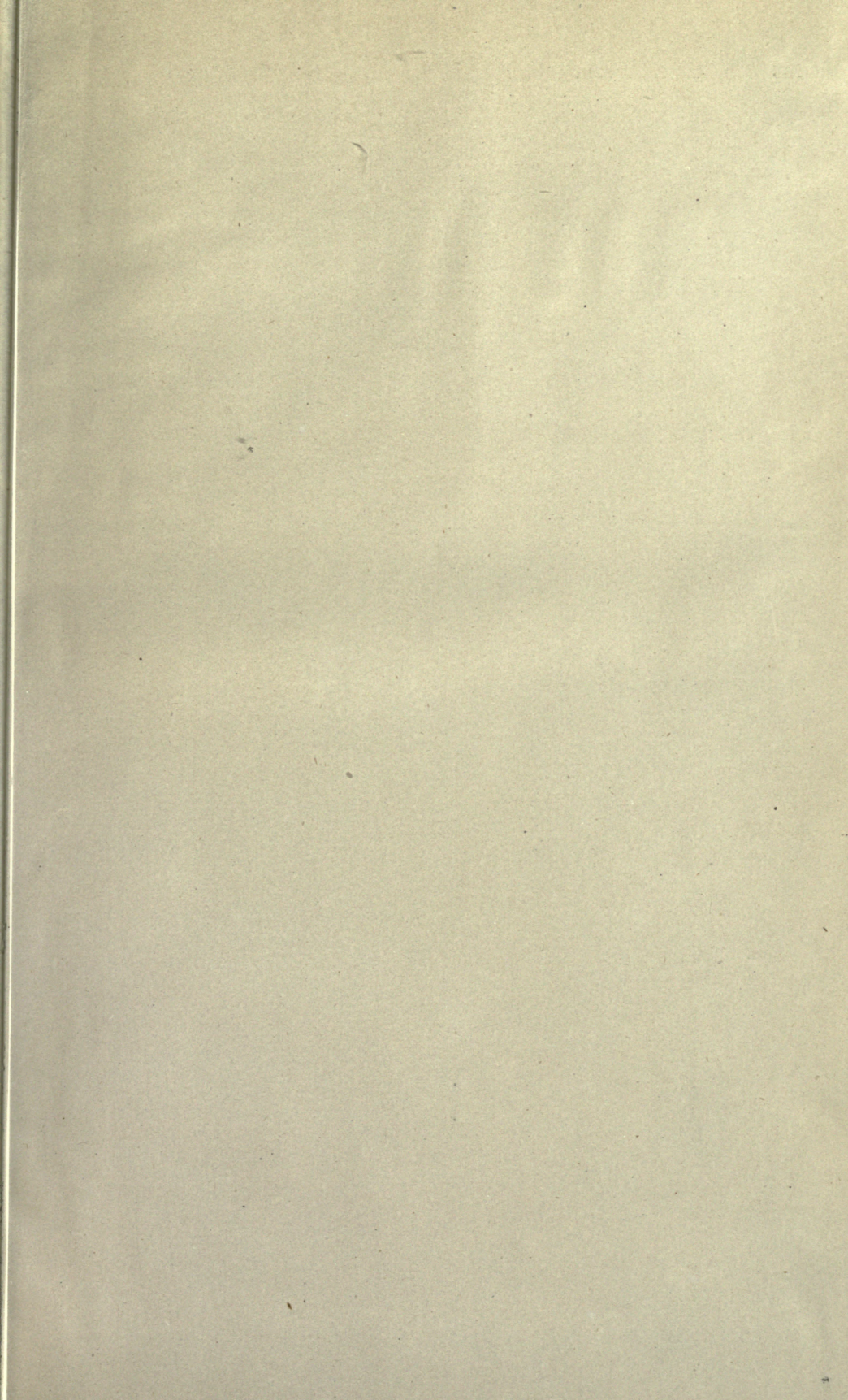
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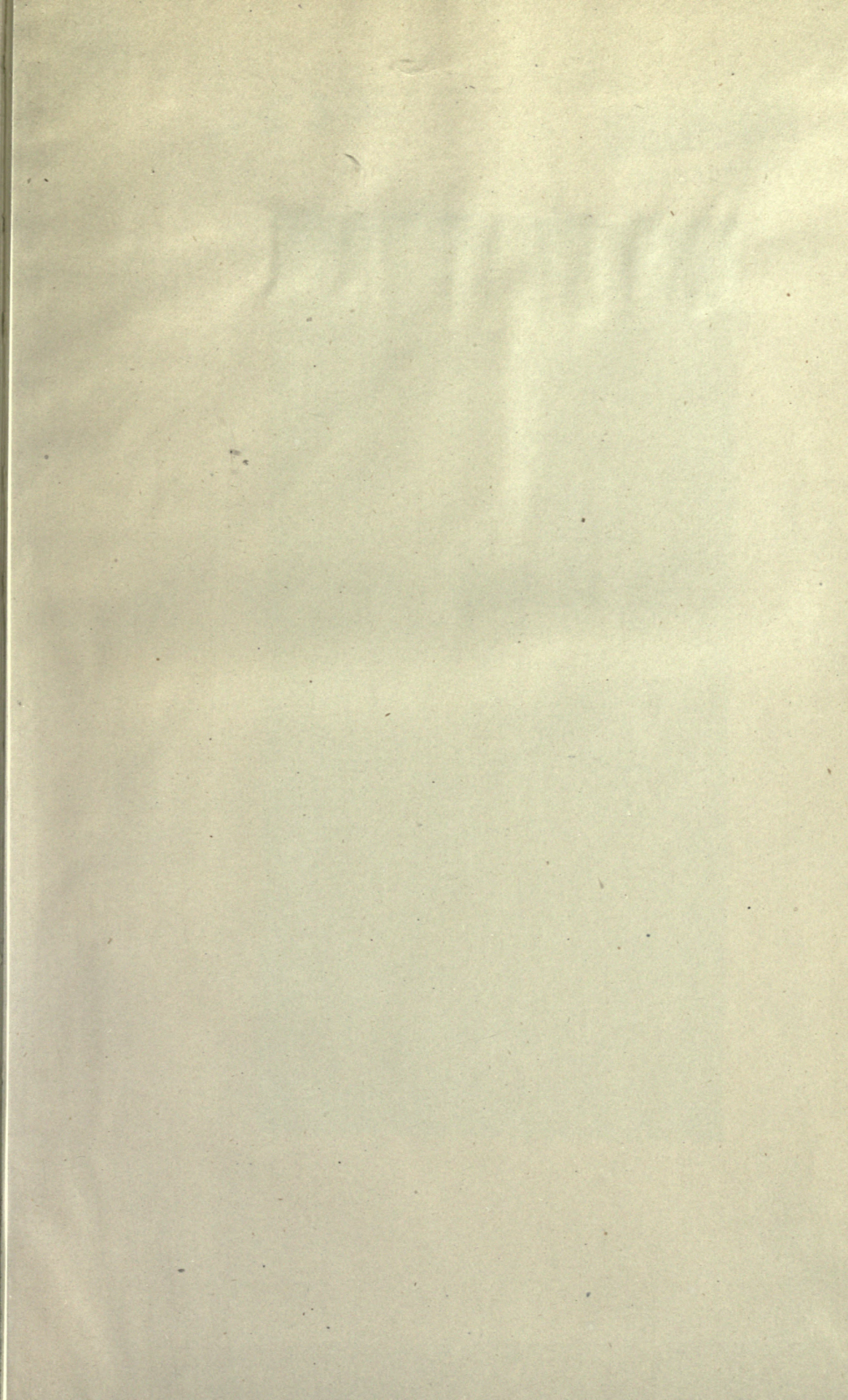
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